ERDC/CERL TR-04-15

Construction Engineering Research Laboratory

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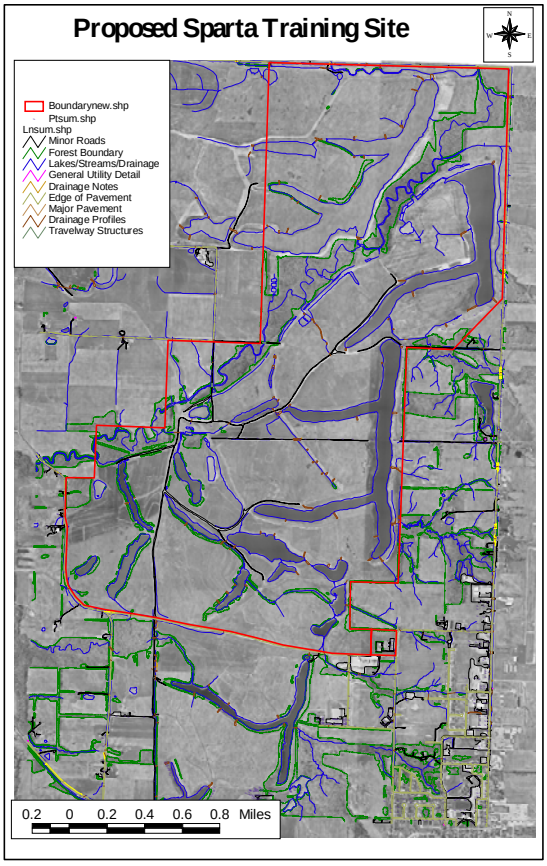
Wildlife Baseline Survey

Illinois Army National Guard, Sparta, Illinois

Don Pitts and Jonathan L. Casebeer

September 2004



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Final Report

Prepared for U.S. Army Corps of Engineers
Washington, DC 20314-1000

Under Work Unit CNN-T081

ABSTRACT: The Illinois Army National Guard (ILARNG) is acquiring a new 2800-acre reclaimed strip mine as a training area near Sparta, Illinois. This acquisition is important in that it allows the National Guard units in southern Illinois a readily available place to train, which will increase training effectiveness and save time and money through decreased travel costs associated with using the existing training area in the northern part of the state. Training importance is further enhanced by the existence of three diverse natural ecosystems, thereby offering variety of training.

The recent acquisition of the Sparta training area represents a unique opportunity to gather baseline data before any training takes place. This valuable data will give the Army the opportunity to learn about the conditions before and after training as well as strengthening any future empirically collected research data. This represents a fundamental knowledge gap in much of the current research on Army lands and represents a high priority, high payoff area of research.

The three ecosystems — riparian forest, upland plains, and lakes —were surveyed for birds, mammals, reptiles and amphibians in accordance with generally approved methods. Winter, spring and summer surveys were conducted to determine species present and relative abundance.

Contents

Conversion Factors

Non-SI* units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
acres	4,046.873	square meters
cubic feet	0.02831685	cubic meters
cubic inches	0.00001638706	cubic meters
degrees (angle)	0.01745329	radians
degrees Fahrenheit	(5/9) x (°F – 32)	degrees Celsius
degrees Fahrenheit	(5/9) x (°F – 32) + 273.15.	kelvins
feet	0.3048	meters
gallons (U.S. liquid)	0.003785412	cubic meters
horsepower (550 ft-lb force per second)	745.6999	watts
inches	0.0254	meters
kips per square foot	47.88026	kilopascals
kips per square inch	6.894757	megapascals
miles (U.S. statute)	1.609347	kilometers
pounds (force)	4.448222	newtons
pounds (force) per square inch	0.006894757	megapascals
pounds (mass)	0.4535924	kilograms
square feet	0.09290304	square meters
square miles	2,589,998	square meters
tons (force)	8,896.443	newtons
tons (2,000 pounds, mass)	907.1847	kilograms
yards	0.9144	meters

*_Système International d'Unités_ ("International System of Measurement"), commonly known as the "metric system."

Preface

This study was conducted for the Office of the Directorate of Environmental Programs (DAIM), Assistant Chief of Staff (Installation Management) (ACS[IM]) under project 622720896, "Environmental Quality Technology"; Work Unit CNN-T081. The technical monitor was Dr. Vic Diersing, DAIM-ED-N.

The Construction Engineering Research Laboratory (CERL) Principal Investigator was Don Pitts. The Illinois National Guard manager was Jonathan L. Casebeer. The work was performed by Don Pitts, assisted by Joshua Brown. Mr. Stephen Hodapp is Chief, CEERD-CN-N, and Dr. John T. Bandy is Chief, CEERD-CN. The associated Technical Director was Dr. William D. Severinghaus, CEERD-CV-T. The Director of CERL is Dr. Alan W. Moore.

CERL is an element of the U.S. Army Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. The Commander and Executive Director of ERDC is COL James R. Rowan and the Director of ERDC is Dr. James R. Houston.

1 Introduction

Background

Army User Requirements

Documentation of the Army's environmental technology requirements has been an iterative process that began with a series of meetings in 1993 and the publication, *U.S. Army Environmental Requirements and Needs* from the Office of the Directorate of Environmental Programs. The Army's environmental technology requirements describe the critical research, development, test, and evaluation needs for accomplishing the Army's mission with the least impact or threat to the environment. These requirements are Army-level requirements that were reviewed for their impacts to readiness and quality of life, impact or threat to the environment, and timeliness needed for the Army to maintain compliance with environmental regulations. All major commands, major subcommands, the Office of the Deputy Chief of Staff for Operations, and the Office of the Deputy Chief of Staff for Logistics were involved in establishing the prioritized and validated list of the Army's environmental technology requirements.

Land Capacity and Characterization is the third priority conservation user requirement. This user requirement defines the Army's need to estimate training land carrying capacity. Twenty-eight exit criteria were initially identified in the *Land Capacity and Characterization* user requirement; other criteria have been added. (See Appendix A for additional information.) Each exit criteria defines a specific product required to address a specific aspect of the overall requirement. Several of the exit requirements require detailed understanding of installation natural resources.

The Sparta Training Area

The Illinois Army National Guard (ILARNG) is acquiring a 2800-acre reclaimed strip mine training area near Sparta, Illinois. This acquisition is important in that it allows the National Guard units in southern Illinois a readily available place to train, which will increase training effectiveness and save time and money through decreased travel costs associated with using the existing training area in the northern part of the state.

The activities likely to take place at the Sparta Training Area include, but are not limited to bivouac operations, assembly area and training of vehicle units, and various foot-traffic type operations. The ILARNG plans site improvements including an improved road network, hardening sites where substantial erosion would otherwise occur, and extensive tree planting to provide for tactical concealment areas. These improvements will increase the training realism and effectiveness and decrease any off-site impacts.

Prior to acquisition by the ILARNG the site was used by the Peabody Coal Co. for coal extraction activities. After the mining activities had been completed, the site was rehabilitated with topsoil and vegetation. Before mining began, the land was used for various agricultural operations since about the 1830's. Before that time the land was a natural prairie system.

Objective

The objective of this research was to gather valuable baseline biological data on the Sparta training area before any training and land management options occur. This baseline data is valuable in that it gives the Army the unique opportunity to learn about the conditions before and after training as well as strengthening any future empirically collected research data. Military training will be accomplished on the site after this research. This represents a fundamental knowledge gap in much of the current research on Army lands. Installation personnel and researchers from the Army as well as outside sources have corroborated that this kind of data represents a high priority, high payoff area of research. To further gain knowledge of the actual impact of military training, it is essential for future studies to be developed and funded, which will correlate back to this baseline information.

Approach

The wildlife of the training area were surveyed using techniques (discussed in Chapter 2) that are in common use by wildlife biologists and are accepted protocol in the science. As there are three distinct ecosystems (riparian bottomland, upland prairie, and lake), each protocol was used in each individual ecosystem. The upland prairie includes small, isolated, elevated, potential manmade concave wetlands; the riparian forest system also has potential open canopy wetlands. Surveys were conducted in January when the mean high temperatures were 35°F, in May when mean highs were 60°F to 75°F, and in late June when mean high temperatures were approaching 90°F.

Scope

This report outlines the research and monitoring activities undertaken at the Illinois National Guard Sparta Training Area during January, May, and June 2003. The general activities may be applicable to any Army site; however the specific research and monitoring apply only to the Sparta Training Area.

Mode of Technology Transfer

The data gathered during this project have been provided to the ILARNG. It is also available to other land managers and research personnel from the Illinois Army National Guard.

This report (without additional data) will be made accessible through the World Wide Web (WWW) at URL:

http://www.cecer.army.mil

2 Ecosystem Assessment

Surface coal mining was and to some degree still is a major industry in the American Midwest. By nature of this activity, there is significant ecological disturbance, though reclamation is certainly possible and provides an environmental and habitat opportunity. The earlier coalmines received no reclamation efforts, left as scars on the earth for nature alone to rehabilitate. Federal and state laws enacted in the 1950's required extensive reclamation efforts, with Illinois being one of the most stringent states. The Peabody Coal Mine of Randolph County, Illinois, was mined in the era requiring reclamation. Since Illinois reclamation laws centered on a return to land suitable for agriculture, reclamation efforts were so directed and did not consider habitat. On the Peabody property, reclamation meant planting to forage and hay vegetation. The deep coal pits were converted to large lakes. There is a substantial riparian flood plain traversing the length of the property, and other than pollution, this forested floodplain was unaffected by the mining operation. As the whole ecosystem seeks further recovery, the riparian system is well recovered and supports an aquatic reptile and amphibian population that exceeds the region in numbers of individuals and species diversity. The problems of this ecosystem are its history, mining, and non-native plant reclamation. The future is in native plant restoration.

Site Description

Randolph County, Illinois, is characterized by rolling hills and relatively slow, muddy-bottomed creeks. The soil is, by Illinois standards, somewhat poor, but still suitable to a wide array of agricultural enterprise. Surface coalmines are prevalent in the region and this has a correlation to the less-than-ideal agricultural environment (Holl 2002). In truth, Illinois laws may be too stringent in that coal-rich lands are usually of less agriculture importance due to subsoil, shallow bedrock, and soil chemistry. The statutory requirement to restore a closed coalmine to a state suitable for agriculture may be unrealistic. However, restoring a coalmine to become excellent habitat is quite realistic.

The 2800-acre site Peabody coalmine property has three distinct ecosystems: lakes formed from the coal pits, a distinct upland region of rolling hills, and the riparian floodplain that is the only ecosystem left relatively untouched by the mining operations. The upland regions are relatively productive due to legal requirements to

remove and save topsoil, and replace it when mining operations cease. Somewhat unique to these rolling hill uplands is the relatively shallow bedrock, characteristic of coal-laden land, which provides for significant manmade upland wetlands through a lack of permeability. These manmade upland wetlands vary from 2 square meters to 200 square meters and provide a significant habitat to waterfowl and amphibians that is unique to the region.

The upland, though planted in non-native forage crops, still provides significant upland habitat, consistent with findings in other uplands of restored coalmines (Devault et al. 2002; Bajema et al. 2001; Ireland et al. 1994). These uplands provide significant erosion and sediment control, and stabilize the nutrient load, permeation, and runoff (Verb and Vis 2000).

Upland vegetation is particularly important to wetland and riparian health, and to this study site as it controls erosion and retains potential pollution. Walsh et al. (2003) noted the importance of the surrounding landscape to aquatic ecosystems in Michigan, and also found that the upland physiognomy nearest the wetland had the most significant impact. In the upland, isolated wetlands are characterized by native wetland vegetation and are important aquatic reptile and amphibian habitat, consistent with the description of Gibbons (2003). These small, isolated wetlands also were important to birds, especially waterfowl. Some were found to harbor successful nesting and fledging.

The riparian system, though essentially not affected by the mining operations, did suffer from vehicular traffic and pollution. In this situation the primary fear would be acidification and heavy metal pollution of the floodplain and associated natural and manmade wetlands (Cole and LeFebvre 1994, Sharmasarkar and Vance 1995). Still, the floodplain is extensive and quite intact when compared to the region. There is no evidence of channelization, logging, excavation, or other unnatural disturbance. The floodplain includes several auxiliary channels and a heavily forested area extending from 40 m across to 200 m across, depending more on topography than anthropogenic activity.

The vegetation of the entire plot is often more representative of the upland environment, as is often the case since riparian areas are normally a rather small landmass of the total ecosystem. Most of the upland plants are forage crops planted during reclamation efforts. However, native plant species are present and appear to be spreading, as are some invasives such as multiflora rose and honeysuckle.

There are 186 possible species of birds that could be observed on this site. During the course of this survey, 73 different species were observed. This possible and observed number of species is somewhat large for a 2800-acre property in this region,

this being due to the three diverse ecosystems (uplands, bottomlands, and lakes), that each support species not found in the other ecosystems. This is due to the convergence of these three ecosystems, which provide a unique environment that enhances species diversity. This site has become an important wintering, nesting, and transient bird area for Southern Illinois, particularly for aquatic birds. Several rare and unusual birds for the region (and sometimes nation) were observed, to include several state and federal species of concern. Species diversity is excellent when tested in several indices.

The most significant faunal phenomenon is the aquatic reptile and amphibian richness. The reptile and amphibian populations of the Sparta training site are still evolving. As an active coalmine, the site provided very poor habitat for most fauna, particularly reptiles and amphibians, which is typical of findings of other local studies (Tucker 2000, Ryan et al. 2002). However, as reclamation progressed and mining activity ceased, the animals began to slowly reinhabit the site. As rather slow moving (on land) animals not inclined to extensive exploration or migration, water-related species were probably the first to reinhabit the site. The species that can use water as a means of migration and territory expansion are the well-established populations at this time.

Fish are also important predators of frogs, both adult and tadpole stages, and are the reason for several extinctions and extirpations, particularly in the western part of the State where State game agencies introduced fish to lakes that had previously held no fish. At this site, all of the manmade wetlands on the tops and sides of hills, plus some large intermittent wetlands near the riparian system, have no fish. This is an important reason the site has such a healthy frog and toad population; they are able to live and breed free of fish predation.

Conservation Threats

The primary conservation threats of this site are based in the actual site history. As previously noted, coalfields (even prior to entry of humans of European descent) were not the most productive agricultural fields in the region. Still, production as tall grass prairie was significant and the coalfields represented an important, contributing part of the ecosystem. Surface coal mining is an absolute destruction of an ecosystem during mining activities. Even after mining activities cease and reclamation is completed, there are still significant issues (Kelly and Huddlestron, 2001).

Of this 2800-acre entire ecosystem, the use of agricultural forage crops for upland vegetation is the greatest problem. However, this is a small problem to the riparian

system and is certainly preferable to allowing the uplands to be not covered or covered by species that have fewer environmental externalities.

Coal mining usually results in problems regarding heavy metals and acidity (Troeh et al. 1999), but this appears not to be the case at this site. Waterfowl heavily use the lakes, and a healthy population of native mollusks has been noted in every lake. Fish are also relatively abundant given the present low nutrient availability in the lakes. No acidity problems are presently being observed in the lakes, uplands, wetlands, or the riparian system. Most notable in judging water quality is the large population and species diversity of the frogs, which are often used as indicators of habitat quality.

Since the future intended use of the land is light military training, future land use will have few adverse effects on the fauna and flora. Light infantry and bivouac training that uses few vehicles and little or no ordnance is likely to have little effect.

The riparian floodplains and associated wetlands, and therefore the aquatic reptiles and amphibians, are not likely to be affected by military activities. The floodplains are rather formidable with mature trees and a significant moisture/riparian regime that restrict any vehicular activity and limit human activity. It is likely that this area will be maintained as a natural regime, with natural succession and disturbances. Fertilizer and pesticides will be used to control invasive species as needed on the National Guard property. A likely conjecture would be that this lack of chemical enhancement will favor the return of native flora, as agricultural forage crops were developed with the presence of fertilization and native plants weren't.

Agricultural enterprises upstream of this facility will always present a potential threat to the riparian environment. Inadequate riparian buffers upstream have the potential to introduce excessive sediment and chemical pollution in the form of insecticides and herbicides. This in turn offers opportunities for remediation by the facility's forested floodplain. The facility floodplain is meandering and widens significantly at appropriate locations, allowing for the removal of sediment and polluting chemicals. The extensive vegetation cover of the facility floodplain offers even greater potential for sediment removal and chemical remediation introduced from the upstream agriculture enterprises. At present, the facility system is well capable of handling introduced sediment without significant problems.

There is, of course, always a possibility of chemical devastation from upstream, killing the delicate amphibian populations. At present this does not seem likely as this is a very agriculturally oriented area and such spills are uncommon.

The major problem of this ecosystem is the prehistoric presence of coal, then the mining of the coal, and finally the agriculturally oriented reclamation that used non-native forage crops. The latter will likely lose out to natives and nonagricultural invasives, as wild plants in a wild situation tend to out-compete cultivars. Future threats come from off site, primarily from agricultural activities. However, if off-site activities are no worse than present, this facility will be fully capable of removing, sequestering, and transforming the off-site sediment and agricultural chemicals and nutrients.

In the unlikely event of changes in off-site land use, this facility will likely be better prepared than others in the region due to the well functioning floodplain and associated wetlands.

The amphibians and aquatic reptiles have found a refuge on this facility. They are not molested, and habitat change is generally not anticipated. In the upland areas, the addition of an upland forest for training purposes will ultimately decrease erosion and pollution even more, and add a greater diversity of detritus to the aquatic areas. This planting of native upland trees should be planned so as to not be intrusive on the isolated manmade upland wetlands. The planting of hydrophytic trees near the lakes will further add to the nutrient exchange and habitat of those systems.

The presence of the genus *Neroidia* (water snakes) is slight at present, but this should increase. Much of this scarcity is anthropocentrically induced; most snakes in the region have been killed because of ignorance and superstition. Anecdotal interviews of local residents indicate a historical extermination of snakes on a wholesale basis, and very few recent sightings. This facility, where killing and molestation of snakes has been greatly reduced, will likely have a greatly increased aquatic snake population.

The ramifications of this increase will actually decrease the incredible frog and toad population, but will certainly be within tolerable limitations. Should the water moccasin expand into the facility, genus *Neroidia* will decrease due to predation, but this will marginally enhance the frog and toad population.

Overall, predictions of this ecosystem are consistent with the findings of Bisson, et al (2002), in that upland naturalization will result in riparian naturalization.

Current Conservation Efforts

Current conservation efforts are ecosystem-wide, focusing primarily on the upland areas. This in itself is important, as aquatic ecosystems receive a majority of their nutrient load, both negative and positive, from the uplands. Conservation efforts for the manmade upland wetlands and riparian floodplains are optimal: they are left alone. Vegetative recruitment has been consistent with the findings of Bisson et al. (2002). Future populations of herpetofauna can be anticipated consistent with the results of Ryan et al. (2002), with unimpeded riparian forests and associated wetlands contributing significantly to the overall herpetofauna diversity and balance of the region.

A return to upland prairie flora has been suggested though not funded, and in spite of the decidedly non-native upland, agriculturally oriented vegetation species, the present vegetation is functioning well. While native vegetation is certainly more desirable, the present vegetation controls erosion and requires no chemical infusion. This planned lack of fertilization or protection from insects and alternative flora species will probably lead to replacement of the agriculture species by native species. This is due to the fact that cultivars evolved with human assistance, while native plants did not. Hay fields and "improved" pastures eventually become "old-fields."

The manmade upland wetlands are hydrologically independent, but dependent on the riparian system for vertebrate recruitment and DNA diversity. The lakes are independent as well, but could well be polluted by inappropriate application of fertilizer and pesticides in the uplands. This possibility could be mitigated by the addition of shoreline trees, which will also greatly enhance the lake nutrient exchange.

The riparian floodplain is perhaps the ultimate success story and requires the least intervention. Given that the uplands are properly managed, the riparian system will remain healthy. In fact, it remained relatively healthy in the era of coal mining. With the riparian floodplain and its associated wetlands remaining healthy, the aquatic populations will remain healthy.

In a phrase, this system works. The vegetated uplands mean healthy wetlands and a healthy riparian system. A healthy floodplain and associated wetland system means a healthy aquatic population. Current conservation efforts, though they actually are for the purpose of enhancing military training, are consistent with the needs of healthy aquatic and upland ecosystems, therefore providing valuable habitat for the region.

3 Data Collection

Birds were surveyed using the point count/transect combination. This consists of selecting a starting point at random and defining the remaining points at 200-meter intervals along a transect. Stay time at each point was 10 minutes. Birds noted in transit to the next point were also counted. Birds were identified by call and sight, in most cases corroborated by two biologists. Distance from the point was noted as were numbers of individual birds of each species. In accordance with protocol, birds were surveyed from 30 minutes prior to dawn until mid to late morning. Species more obvious in the evenings were surveyed an hour on each side of sunset.

Mammals were noted by sign, such as scat or foot print, or by actual sight. Mice were trapped in live traps set in clusters at random points. Snap traps were not used due to the possibility of occurrence of the Illinois-listed marsh rice rat and golden mouse. Neither of these species was noted during the survey.

Reptiles and amphibians were surveyed by sight, located through extensive hunting that included looking under and in likely areas. Frogs and toads were identified by both sight and call, primarily with within an hour before and after sunset, though calls were also quite frequent throughout the afternoon during the May survey. Snakes and lizards were surveyed primarily in late June, because the May survey period was unseasonably cool and reptile counts were unusually low.

Bats, insects, and aquatic species were not included in the data, though they were observed during the course of this survey. Bats and aquatics will be listed in a separate publication.

Mammals

Through a literature review and a search of Illinois Natural History Survey reports, it was determined that 39 species of mammals were possible occupants of the Sparta Training Area (Table 1). Of these, 12 species have only a remote possibility of occurring on the site. These species were listed as possible because they are known to exist in neighboring counties but not in Randolph County, or they exist in very low numbers in the county. Additionally, the habitat on the site is very marginal habitat for these species, and the site is at the furthest extent of the species' range.

Table 1. Mammals (excluding bats) of the Illinois National Guard Training Facility, Sparta, Illinois.

Species	Common Name	Possible	Probable	Sign	Observed
Marsupials					
Didelphis virginiana	opossum		X	X	X
Insectivores					
Sorex cinereus	masked shrew	X			
Sorex longirostris	southeastern shrew		X		
Blarina brevicauda	northern short-tailed shrew		X		X
Blarina carolinensis	southern short-tailed shrew		X		
Cryptotis parva	least shrew		X		X
Scalopus aquaticus	eastern mole		X		
Lagomorphs					
Sylvilagus floridanus	eastern cottontail rabbit		X	X	X
Sylvilagus aquaticus	swamp rabbit		X		
Rodents					
Tamias striatus	eastern chipmunk		X		
Marmota monax	woodchuck		X		X
Sciurus carolinensis	gray squirrel	X			
Sciurus niger	fox squirrel		X	X	X
Glaucomys volans	flying squirrel		X		
Geomys bursarius	plains pocket gopher	X			
Castor canadensis	beaver		X	X	X
Oryzomys palustris	marsh rice rat	X			
Peromyscus maniculatus	deer mouse		X	X	X
Peromyscus leucopus	white-footed mouse		X	X	X
Ochrotomys nuttalli	golden mouse	X			
Microtus ochrogaster	prairie vole		X		
Microtus pinetorum	pine vole		X		
Ondatra zibethicus	muskrat		X	X	X
Synaptomys cooperi	southern bog lemming	X			
Rattus norvegicus	Norway rat	X			
Mus musculus	house mouse	X			
Zapus hudsonius	meadow jumping mouse		X		
Carnivores					
Canis latrans	Coyote		X	X	X
Coyote/dog hybrid	coydog		X	X	X
Vulpes vulpes	red fox		X	X	X
Orocyon cinereoargenteus	gray fox		X		
Procyon lotor	raccoon		X	X	X

Species	Common Name	Possible	Probable	Sign	Observed
Mustela frenata	long-tailed weasel	X			
Mustela vison	mink		X		X
Mephitis mephitis	striped skunk	X		?	
Felis rufus	bobcat	X		X	
Ungulates					
Odocoileus virginianus	White-tailed deer		X	X	X

Mammals were noted as probable if they are known to occur within the county and suitable habitat is available on the site. However, unless otherwise noted, the survey did not indicate occurrence on the site. The fact that no sign or actual sighting occurred does not eliminate the possibility of their current presence or future inhabitation. Reasons for a species being present but not observed are numerous: (1) the species occurs in very small numbers, (2) the species is extremely secretive and elusive, such as the bobcat and certain shrews, (3) the species uses areas off site as well, as do all the large carnivores, (4) chance kept the species from being noted, (5) the species is adverse to traps, and (6) the species is nocturnal, which makes it more difficult to adequately locate.

A species was noted as present on the site if adequate sign was observed even though an individual was not observed. Scat can sometimes be used as adequate sign, but without DNA test (which was not performed in this survey) errors are possible, particularly with rodents. Coyote, bobcat, deer, raccoon, and fox scat is distinctive, though not used as the exclusive means of identifying any of those species in this survey. For most mammals, tracks are rather certain identifiers of most species, though in this survey tracks were used only to confirm presence when the track was extremely clear and the track for that species is distinctive. This was the case for verifying presence of bobcats; footprints and scat were observed in all three survey visits to the site, though no individual was seen.

Mammal Notes

Exotic species

No exotic species were noted in this survey. Only two possibilities existed for exotic species: the house mouse and the Norway rat, both European species introduced during the early settlement of this nation. These species have spread through the hemisphere and are found living near humans and their structures. These species are not likely to become numerous in the site because there are no buildings or human occupants. However, it is likely a few will eventually be found on the outer fringes near occupied buildings.

A coyote/dog hybrid (sometimes called a "coydog") was observed during the winter survey, as were tracks, which are slightly distinguishable from a pure coyote's tracks. The coydog gave no indication of having a lair on the site and could well have been a transient. Coydogs are likely to be occasionally observed on this site.

No management actions are indicated for exotic species.

Threatened and endangered species

Presence of a federally listed species on this site is highly unlikely. There is a slight possibility of finding two rodents that are listed by the state of Illinois. The state threatened golden mouse and marsh rice rat could both find suitable habitat on this site and have been observed in adjacent counties. None were found in the survey and possible habitat was searched intensely for their presence. It is reasonable to observe that mammals are not a threatened or endangered species issue at this site. A separate bat survey was conducted 30 July to 4 August 2002. The site was rich with bats, but no occurrences of the Indiana Bat.

Population Notes

Beaver

Beaver populations are flourishing as the site offers excellent habitat and little harassment. Beaver enhance their own habitat as well as habitat for other species, and can present interesting training options and create new training environments. The population is stable to the point that removal of a particular individual or dam will not in any way damage the presence of the species.

Coyotes

The coyote population is healthy though not robust, and individuals appear quite healthy and in an excellent state of nutrition. The coyote population at its present stage is an environmental asset for the ecosystem as it is the largest predator on the site.

Bobcats

While no bobcats were observed, there was unmistakable sign in the form of scat and footprints. A lack of observation is the norm for bobcats even among robust populations. Signs of at least two different individuals were noted. The site offers

adequate (though not excellent) habitat and if hunting and trapping are controlled this site will likely become important for this species in the region.

Small rodents

Rats, mice, shrews, and voles are the apparent limiting factor for predatorial species. All survey attempts in all three seasons located few individuals or sign. Apple pieces were the most successful bait in the traps, though searches in likely habitat were more successful than trapping. This survey was adequate in establishing that the small rodent species are in fact low in number, which in turn limits the predatorial species that require them. These low populations are rather obviously the result of a lack of native food since the mine company's reclamation efforts greatly favored non-native forage species. Enhancement with native species will increase native rodent populations and therefore other populations on up the food chain.

Deer

The site offers a robust population of deer. The greatest benefit to the region would be derived by either not allowing or greatly restricting hunting on the site, thereby allowing the site to continuously resupply deer to the lands off site. There were no indications of over-population by deer, and no apparent damage to vegetation. The individuals appear very healthy and well nourished.

Birds

There are 186 possible species of birds that could be observed on this site. During the course of this survey 73 different species were observed (see Table 2 and Appendix B). This possible and observed number of species is somewhat large for a 2800-acre property in this region, and is probably due to the three diverse ecosystems (the riparian forest, upland plains, and large lakes), each of which supports species not found in the others. This site has become an important wintering, nesting, and transient bird area for southern Illinois. The most populous bird species is the red-winged black-bird because all three ecosystems offer some habitat for this species. That species is also arguably the most numerous bird species in this hemisphere.

Table 2. Birds of the Sparta Training Site.

Scientific Name	Common Name	Observed	Abundance/ Status[1]
Grebes – Podicipedidae			
Podiceps auritus	Pied-billed*[2]	X	OT
Cormorants – Phalacrocoracidae			
Phalacrocorax auritus	Double-crested	X	UT
Herons - Ardeidae			
Ardea herodias	Great Blue	X	CP
Butorides striatus	Green	X	CS
Vultures - Cathartidae			
Cathartes aura	Turkey	X	CS
Waterfowl - Anatidae			
Branta canadensis	Canada Goose	X	CP
Chen caeurlescens	Snow Goose		OW
Aix sponsa	Wood Duck		OS
Anas platyrhynchos	Mallard	X	CP
Anas rubripes	Black Duck		UW
Anas crecca	Green-winged Teal	X	RT
Anas discors	Blue-winged Teal	X	RT
Anas cyanoptera	Cinnamon Teal		RT
Aytha affinis	Lesser Scaup		RT
Aythya marila	Greater Scaup		RT
Lophodytes cucullatus	Hooded Merganser		RT
Mergus serrator	Red-breasted Merganser		OT
Mergus merganser	Common Merganser		OT
Bucepheala clangula	Common Goldeneye		OT
Anas strepera	Gadwall	X	OT
Anas Americana	American Wigeon		OT
Anas acuta	Common Pintail	X	OT
Anas clypeta	Northern Shoveler		UT
Aythya Americana	Redhead		OT
Aythya valisineria	Canvasback		OT
Bucephala albeola	Bufflehead		RT
Oxyura jamaicensis	Ruddy Duck		RT

[1] C = common, may be found in appropriate habitat and season.
U = uncommon.
R = rare.
O = occasional (rarely found and not likely present annually.
P = permanent resident, or has this potential.
S = summer resident; if present, most likely in the summer.
W = winter resident; if present, most likely in the winter.
T = transient; if present, most likely during migration or intermittently.

[2] An asterisk denotes a species listed as threatened in Illinois.

Scientific Name	Common Name	Observed	Abundance/ Status[1]
Raptors - Acciptridae			
Circus cyaneus	Northern Harrier **[3]	X	UW
Accipiter striatus	Sharp-shinned Hawk		OP
Accipiter cooperii	Cooper's Hawk	X	UP
Buteo lineatus	Red-shouldered Hawk*		RP
Buteo platypterus	Broad-winged Hawk		RW
Buteo jamaicensis	Red-tailed Hawk	X	CP
Buteo lagopus	Rpugh-legged Hawk		OW
Haliaseetus leucocephalus	Bald Eagle #[4]		OW
Falco sparverius	American Kestrel	X	UP
Falco peregrnus	Peregrine Falcon		OT
Quail, Turkeys, and Pheasant – Meleagridae and Phasianidae			
Colinus virgianus	Northern Bobwhite	X	UP
Meleagris gallopavo	Wild Turkey	X	UP
Phasianus colchicus	Ring-neck Pheasant		UP
Rails and Coots – Rallidae			
Fulica americana	American Coot	X	UT
Porzana carolina	Sora		RT
Rallus limicola	Virginia Rail	X	OT
Rallus longirostris	King Rail		OT
Plovers - Charadiidae			
Charadius vociferious	Killdeer	X	CS
Sandpipers - Scolopacidae			
Philohela minor	American Woodcock		US
Capella gallinago	Common Snipe		RS
Tringa solitaria	Solitary Sandpiper		OT
Doves – Columbidae			
Zenaida macroura	Mourning	X	CP
Columba livia	Rock		UP
Cuckoos - Cuckilidae			
Coccyzus americanus	Yellow-billed	X	US
Coccyzus erythropthalmus	Black-billed		US
Owls – Tytonidae and Strigidae			
Otus asioEastern	Screech		RP
Bubo virginianus	Great-horned	X	UP
Strix varia	Barred		RP
Asio flammeus	Short-eared*		OT

[3] Two asterisks denote a species listed as endangered in Illinois.

[4] A pound symbol denotes a species federally listed as threatened.

Scientific Name	Common Name	Observed	Abundance/ Status[1]
Aegolus acadicus	Northern Saw-whet		OT
Goatsuckers - Caprimulgidae			
Chordeiles minor	Common Nighthawk	X	US
Caprimulgus vociferus	Whip-poor-will		RS
Caprimulgus carolinensis	Chuck-will's-widow		RS
Swifts – Apodidae			
Chaetura pelagiica	Chimney Swift	X	US
Hummingbirds – Trochilidae			
Archilochus colubris	Ruby-throated Hummingbird	X	US
Kingfishers - Alcedinidae			
Megaceryle aclcyon	Belted	X	US
Woodpeckers - Picadae			
Melanerpes etythrocephalus	Red-headed		UP
Melanerpes carolinus	Red-bellied	X	CP
Sphyrapicus carius	Yellow-bellied Sapsucker		RP
Poides pubescens	Downy	X	CP
Picoides villosus	Hairy		UP
Colaptes auratus	Common Flicker	X	CP
Dryocopus pileatus	Pileated		RP
Flycatchers - Tyrannidae			
Tyrannus tyrannus	Eastern Kingbird	X	CS
Sayornis phoebe	Eastern Phoebe	X	CS
Contopus virens	Eastern Wood-pewee	X	CS
Myiarchus crintus	Great-crested Flycatcher	X	US
Empidonax minimus	Least		RT
Nuttallornis borealis	Olive-sided		RT
Empidonax virescens	Acadian		RS
Empidonax traillii	Willow		RS
Shrikes - Laniidae			
Laius ludovicianus	Loggerhead*	X	RS
Vireos- Vireonidae			
Vireo olivacues	Red-eyed	X	US
Vireo gilvus	Warbling	X	UT
Vireo solitarius	Solitary		RT
Vireo philadelphicus	Philadelphia		RT
Vireo griseus	White-eyed		RS
Vireo flavifrons	Yellow-throated		RS
Jays and Crows - Corvidae			
Cyanocitta cristata	Blue Jay	X	CP
Corvus brachyrhynchos	American Crow	X	CP

Scientific Name	Common Name	Observed	Abundance/ Status[1]
Swallows - Hirundinidae			
Hirundo rustica	Barn	X	CS
Stelgidopteryx ruficollis	Rough-winged	X	CS
Iridoprocne bicolor	Tree	X	RS
Progne subis	Purple Martin	X	RS
Chickadees and Titmice - Paridae			
Parus atricapillus	Black-capped Chickadee		UW
Parus carolinensis	Carolina Chickadee	X	CP
Parus bicolor	Tufted Titmouse	X	CP
Nuthatches - Sittidae			
Sitta carolinensis	White-breasted		CP
Sitta canadensis	Red-breasted		UW
Creepers - Certhiidae			
Certhia familiaris	Brown		RW
Wrens - Troglodytidae			
Troglodytes aedon	House	X	CT
Thryothorus ludovicianus	Carolina	X	UP
Troglodytes troglodytes	Winter		RP
Cistothorus platensis	Sedge		OP
Thryomanes bewickii	Bewick's		OP
Kinglets - Regulidae			
Regulus satrapa	Golden-crowned		UW
Regulus calendula	Ruby-crowned		UT
Gnatcatchers - Sylviidae			
Blue-gray		X	US
Bluebirds and Thrushes - Turdidae			
Siala sialis	Eastern Bluebird		UP
Catharus fuscescens	Veery		RT
Catharus minimus	Gray-cheeked Thrush		OT
Catharus guttatus	Hermit Thrush		RT
Hylocichla mustelina	Wood Thrush	X	UT
Catharus ustulatus	Swainson's Thrush		RT
Turdus migratorius	American Robin	X	CT
Mockingbirds - Mimidae			
Dumetella carolinensis	Gray Catbird	X	CS
Mimus polyglottos	Northern Mockingbird	X	UP
Toxostoma rufum	Brown Thrasher	X	CS
Starlings - Sturnidae			
Sturnus vulgaris	European	X	CP
Waxwings - Bombycillidae			
Bombycilla cedrorum	Cedar	X	UW

Scientific Name	Common Name	Observed	Abundance/ Status[1]
Wood Warblers - Parulidae			
Setophaga ruticilla	American Redstart		UT
Dendroica castanea	Bay-breasted		RT
Mniotilta varia	Black-and-white		RT
Dendroica fusca	Blackburnian		RT
Dendroica striata	Blackpoll		RT
Dendoica caerulescens	Black-throated Blue		RT
Dendroica virens	Black-throated Green		UT
Vermivora pinus	Blue-winged		RS
Wilsonia Canadensis	Canada		RT
Dendroica cerulea	Cerulean		OT
Dendroica pensylvanica	Chestnut-sided		RT
Geothlypis trichas	Common Yellowthroat	X	CS
Oporornis agilis	Connecticut		RT
Vermivora chrysoptera	Golden-winged		RT
Wilsonia citrina	Hooded		RT
Oporonis formosus	Kentucky		RT
Seiurus aurocapillus	Louisiana Waterthrush		UT
Dendroica magnolia	Magnolia		RT
Oporornis philadelphia	Mourning		RT
Vermivora ruficapilla	Nashville		RT
Parula americana	Northern Parula		UT
Vermivora celata	Orange-crowned		RT
Seiurus aurocapillus	Ovenbird		RT
Dendroica palmarun	Palm		RT
Dendroica discolor	Prairie		RT
Protonotaria citrea	Prothonatary		RS
Vermivora peregrina	Tennessee		OT
Wilsonia pusilla	Wilson's		OT
Limnothlypis swainsonii	Worm-eating		OT
Dendroica petechia	Yellow	X	UT
Icteria virens	Yellow-breasted Chat		US
Dendroica coronata	Yellow-rumped		CW
Dendroica dominica	Yellow-throated		US
Tanagers - Thraupidae			
Piranga olivacea	Scarlet		RS
Piranga rubra	Summer		RS
Grosbeaks, Buntings, Longspurs, Towhees, and Sparrows - Fringillidae			
Pheucticus ludovicianus	Rose-breasted Grosbeak		UT
Guiraca caerulea	Blue Grosbeak	X	RS
Passerina cyanea	Indigo Bunting	X	CS
Cardinalis cardinalis	Northern Cardinal	X	CP
Spiza Americana	Dickcissel	X	CS

Scientific Name	Common Name	Observed	Abundance/ Status[1]
Junco hyemalis	Dark-eyed Junco		CW
Carpodacus mexicanus	House Finch		CP
Carpodacus purpureus	Purple Finch		RW
Carduelis tristis	American Goldfinch	X	CP
Carduelis pinus	Pine Sisken		RT
Calcarius lapponicus	Lapland Longspur		RW
Pipilo erythrophthalmus	Eastern Towhee	X	CP
Spizella arborea	American Tree Sparrow		CW
Spizella passerinca	Chipping Sparrow		CS
Spizella pusilla	Field Sparrow	X	CP
Passerella iliaca	Fox Sparrow		RW
Ammodramus savannarum	Grasshopper Sparrow	X	US
Ammodramus henslowii	Henslow's Sparrow*		RS
Ammospiza leconteii	LeConte's Sparrow		RT
Melospiza lincolnii	Lincoln's Sparrow		RT
Passerculus sandwichensis	Savannah Sparrow	X	RT
Melospiza melodia	Song Sparrow	X	UP
Melospiza georgiana	Swamp Sparrow		RW
Pooecetes gramineus	Vesper Sparrow	X	US
Zonotrichia leucophrys	White-crowned Sparrow		CW
Zonotrichia albicollis	White-throated Sparrow		CW
Blackbirds, Grackles, Meadowlarks, and Orioles - Icteridae			
Agelaius phoeniceus	Red-winged Blackbird	X	CP
Euphagus carolinus	Rusty Blackbird		RT
Euphagus cyanocephalus	Brewer's Blackbird		RT
Quiscalus quiscula	Common Grackle	X	CP
Sturnella magnus	Eastern Meadowlark	X	CP
Molothrus ater	Brown-headed Cowbird	X	CP
Icterus galbula	Baltimore Oriole	X	CS
Icterus spurious	Orchard Oriole	X	RS

Several rare and unusual birds for the region (and sometimes nation) were observed, including several state and federal species of concern. Species diversity is excellent when tested in several indices. American goldfinch numbers and density are somewhat higher than usual, but this is certainly due to the thistles present, including the musk thistle. Goldfinches require thistles for nesting material and feed, and much of the goldfinch activity was in the vicinity of thistle stands.

The turkey population is healthy and apparently free from the domestic hybridization that is common in farming areas with commercial turkey enterprises. The quail population is flourishing as well. No pheasants were sighted but this is most likely an anomaly; it is likely that pheasants inhabit the site.

The most obviously absent group was the warblers, and this is generally due to a lack of upland forested habitat. Future plans for this addition will increase the populations of this group and overall diversity as well.

Exotic species

Only two foreign endemic birds were noted, the very common English sparrow and the starling. Both are more adapted to humans and their structures than to relatively natural areas such as this site, and populations were less than would be found on farms and in towns nearby. There are no exotic bird management practices necessary at this time.

Threatened and endangered species

The site is bird-rich, with a significant number of rare and unusual species noted in the survey. No federally listed species were observed, though there is a possibility one may be a winter or transient visitor. There are seven possible state listed birds; three were observed in this survey. There are opportunities to enhance the populations of these listed species, and those opportunities would likely enhance training as well. There are no described training plans that will raise issues with the listed birds present.

Bald eagle

Only one federally listed species, the federally threatened bald eagle has a possibility of being observed on this site and this would be as an occasional wintering bird. This bird is also listed by Illinois as threatened. There are ample tall snags and lakes large enough to accommodate eagles, though no eagles were noted in the survey. This species, like many others and the general ecosystem of the site, would be enhanced by planting trees around the larger lakes.

Pied-billed grebe

A single pied-billed grebe was sighted in the winter survey, and a few more waterfowl too distant to positively identify were probably also grebes. These birds are listed as threatened in Illinois. This site offers good winter and transient habitat for this species.

Northern harrier

The northern harrier is listed as endangered in Illinois, though the population on this sight is quite robust. It is interesting to note (Table 2) that all literature avail-

able lists this as an unusual winter visitor. In fact, northern harriers were sighted in July 2002 and during the survey visits in January, May, and June 2003. This site offers excellent northern harrier habitat, and would be even better with more native grasses and forbs to enhance the small rodent population.

Red-shouldered hawk

No red-shouldered hawks were observed in this survey, though the habitat and prey is certainly present. This is a woods habitat predator, and is also a species of concern federally. Habitat improvement for this hawk would include planting upland wooded areas.

Short-eared owl

The short-eared owl was not located during the surveys, but suitable habitat does exist on the site. This day-hunting bird prefers open marshes and open uplands. Suitable habitat is available for winter, summer, or transient status.

Loggerhead shrike

State listed as threatened and a federal species of concern, three shrikes were observed during the course of the survey. They usually will be found in open spaces and brushy areas. The shrike population will be enhanced by planting native grasses and forbs.

Henslow's sparrow

This state-threatened bird has previously been noted in literature as inhabiting reclaimed coalmines in the north-central United States. Though this is likely habitat for this species, none were observed during this survey. This meadow species would be enhanced by planting native grasses and forbs.

Management Recommendations

Reintroducing native grasses and forbs and maintaining them with fire will further increase bird populations, densities, and diversity. Cultivating upland forest areas of native species will have the same positive effects. These recommendations will also enhance realistic training opportunities.

The cowbird population is not rampant at this time because grazing is not a major activity in the area. Should cowbird populations increase, a trapping program may be indicated to protect the vulnerable species of concern and state-listed species.

Military training plans and land management options as presently described should have negligible effects on the bird populations at this site.

Reptiles and Amphibians

The reptile and amphibian populations of the Sparta training site are still evolving (Table 3). When it was an active coalmine, the site provided very poor habitat for most fauna, particularly reptiles and amphibians. However, as reclamation progressed and mining activity ceased, the animals began to slowly reinhabit the site. As rather slow moving animals not inclined to extensive exploration or migration, water-borne species were the first to reinhabit the site and because of this the species that can use water as a means of migration and territory expansion are the well-established populations at this time.

Table 3. Amphibians and reptiles at the Sparta Site.

Common name	Scientific name	Observed
Salamanders		
Smallmouth salamander	*Ambystoma texanum*	
Tiger salamander	*Ambystoma tigrinum*	
(Longtailed salamander)[1]	*Eurycea longicauda*	
Frogs and toads		
American toad	*Bufo americanus*	
Fowlers toad	*Bufo fowleri*	X
Cricket frog	*Acris crepitans blanchardi*	X
Green treefrog	*Hyla cinerea*	
Grey treefrog-complex	*Hyla versicolor-chrysoscelis*	X
Spring peeper	*Pseudacris crucifer crucifer*	X
Western chorus frog	*Pseudacris triseriata triseriata*	X
(Eastern narrowmouth toad)	*Gastrophryne carolinensis*	
Plains leopard frog	*Rana blairi*	
Bullfrog	*Rana catesbeiana*	X
Green frog	*Rana clamitans*	

[1] Parentheses around the common name indicate presence is possible but unlikely.

Common name	Scientific name	Observed
Pickerel frog	*Rana palustris*	X
Southern leopard frog	*Rana utricularia*	X
Turtles		
Snapping turtle	*Chelydra serpentina*	X
Painted turtle	*Chrysemys picta*	X
Eastern box turtle	*Terrapene carolina*	
Ornate box turtle	*Terrapene ornata*	X
Slider	*Trachemys scripta*	X
Common musk turtle	*Sternotherus odoratus*	
Smooth softshell	*Apalone mutica*	X
Ouachita map turtle	*Graptemys ouachitensis - hybrids*	
False map turtle	*Graptemys pseudogeographica*	X
Snakes		
Worm snake	*Carphophis amoenus helanae*	
Eastern hognose snake	*Heterodon platyhinos*	
Western hognose snake	*Heterodon nasicus*	
Yellowbelly water snake	*Nerodia erythogaster flavigaster*	
Diamondback water snake	*Nerodia rhombifer*	
Northern water snake	*Nerodia sipedon sipedon*	X
Midland water snake	*Nerodia sipedon pleuralis*	
Graham's crawfish snake	*Regina grahamii*	
Western ribbon snake	*Thamnophis proximus proximus*	
(Common garter snake)	*Thamnophis sirtalis sirtalis*	
(Smooth earth snake)	*Virginia valeriae*	

Turtles

No rare turtles were noted, nor was a probability of their occurrence. The alligator snapping turtle, a listed species in Illinois, may be found in the county but would be highly unlikely at this training site. The turtle populations are healthy, recruitment is evident, and species diversity is excellent. There is a potential for a taxonomic problem as the Ouchita map turtle and the false map turtle may both be found in this area. These turtles readily hybridize. The turtle populations would be enhanced by planting trees near the water's edge of the lakes.

Frogs and toads

The frog and toad populations of this site are phenomenal. Most of the species likely to be found on the site were heard or observed. Population density, habitat utilization, and species diversity are excellent. These factors indicate a lack of pol-

lution and predators. The lack of pollution is commendable because pollution and water acidity are often problems encountered in reclaimed coalmines. Primary predators of frogs and toads are raccoons and snakes, and the site has a very low snake population at this time. Water snakes, the primary predators, are likely to increase.

Salamanders

Two species of salamanders are likely to be observed on this site, though none were found during the survey. The smallmouth salamander is likely to be found in the riparian forest. The tiger salamander isn't ordinarily likely for this site, but its use as a fish bait means it has probably been introduced. The longtailed salamander may have been present before coal mining operations began, but there is now no suitable habitat.

Lizards

It is unlikely that lizards will be found on this site in the near future. Although four species of lizards are known to be in this county, they are all lizards of upland woods, usually contiguous upland woods. Therefore, the lack of habitat precludes the presence of lizards.

Snakes

Snake populations in the region are relatively low, and this is also the case on this study area. Only four snakes were found in 60 hours of searching by an experienced herpetologist. Two were the aquatic northern water snake, and the other two were an upland species of rat snake and a racer. Other species will be found over time, with more water snakes likely in the near future. For upland, mammal-eating snakes to increase, the mammal numbers must also increase, and this will require more native plant species.

Venomous snakes

It is unlikely that venomous snakes will be found on this site. The water moccasin, *Agkistrodon leucostoma*, has not been recorded in this county, though it has been recorded in nearby counties. There is a slight possibility of this species migrating onto the site though the riparian system, but this is very unlikely as this species is already at its northern limits in the more southern Illinois counties.

Copperhead is a species of upland forest areas and this site has none. Should upland forest and copperheads occur, they would also use the riparian forests when

conditions are favorable. This species is widespread in the state and has been recorded in the county, but the present lack of suitable habitat on the site and surrounding area preclude the likelihood of occurrence.

The site is within the range of the timber rattlesnake (*Crotalus horridus*) and massasauga (*Sistrurus catenatus cantenatus*), but they are not likely to occur on the site. There is no suitable habitat for the timber rattlesnake on this site or nearby. This site offers suitable habitat for the massasauga, but none have been officially recorded in the county. They are, however, known to be in nearby counties. This is a shy, secretive snake, listed as endangered in Illinois, and very rare throughout the state.

Threatened and endangered species

Threatened and endangered species issues for reptiles and amphibians are unlikely. A federally listed snake, the copperbelly water snake (*Nerodia erythrogaster neglecta*) has its most northwestern appearance three counties to the southeast. No state or federally listed reptiles are expected to be found at this site. Should one occur, most likely it will be the massasauga, which is state listed as threatened.

Management Recommendations

Present land management plans will increase the health of the reptile and amphibian populations. Restoration of an upland forest area, planting trees at the edges of lakes, and encouraging native plants will all help the reptile and amphibian populations.

Troops should be advised not to kill or molest any wildlife, including snakes.

4 Recommendations

The proposed Illinois National Guard training site is already important habitat for several species of fauna, especially frogs, toads, mammals, and birds. Its importance to migrating and wintering waterfowl is significant. The general health of the mollusk and crustacean species, though not included in this survey, indicates good pH ranges in the soils and water and freedom from pollution. The robust populations of frogs and toads validate this as well.

Reintroducing native grasses and forbs will further increase bird populations, densities, and diversity. Cultivating upland forest areas of native species will have the same positive effects. These recommendations will also enhance realistic training opportunities.

The cowbird population is not rampant at this time because grazing is not a major activity in the area. Should cowbird populations increase, a trapping program may be indicated to protect the vulnerable species of concern and state-listed species.

Military training plans and land management options as presently described should have negligible effects on the bird populations at this site.

Maintenance of this site by the Illinois National Guard, to include their planned training and land management actions, will be beneficial to the wildlife on the site as well as to the wildlife of the region, and therefore an asset to the State of Illinois.

Present land management plans will increase the health of the reptile and amphibian populations. Restoration of an upland forest area, planting trees at the edges of lakes, and encouraging native plants will all help the reptile and amphibian populations.

Troops should be advised not to kill or molest any wildlife, including snakes.

To further gain knowledge of the actual impact of military training, it is essential for future studies to be developed and funded, which will correlate back to this baseline information.

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Appendix A: Army Environmental Requirements

The Army's environmental requirements represent the critical Research, Development, Test, and Evaluation (RDT&E) needs for accomplishing the Army's mission with the least impact on or threat to the environment. These requirements are Army-level requirements and include installation- or weapon-specific needs only when critical to the execution of the Army's mission. This appendix contains the Army's environmental requirements completed in October 2002 for the FY06-FY11 Program Objective Memorandum (POM). As noted in the main text, documentation of the Army's environmental technology requirements has been an iterative process.

The Army environmental requirements are classified into four pillars:

1. Compliance
2. Conservation
3. Pollution Prevention
4. Restoration

The Conservation pillar contains 5 specific requirements:

1. Reducing impacts of Threatened and Endangered Species on military readiness.
2. Maintaining readiness by improving Threatened and Endangered Species monitorin capabilities.
3. Land capacity and characterization.
4. Rehabilitation of natural resources (land conservation and protection).
5. Non-native invasive species control for Army installations and operations.

The Land Capacity and Characterization user requirement encompasses:

Conservation of cultural and/or natural resources.
Compliance with local, state, Federal, or Army regulations.

This requirement focuses on natural resources management, soil sustainment, and watershed management and should take into account the impact on soil, vegetation, and watersheds.

The following criteria must be met for this requirement to be resolved:

By FY99:

- Improve the RUSLE C and LS Factors for integration into the ATTACC methodology.
- Develop a methodology for identifying the distribution of training impacts.

By FY00:

- Develop a protocol, tool(s) and/or factors for installation level use that reflects a probable range of results in the ATTACC methodology.
- Develop a protocol, tool(s) and/or factors for installation level use that integrates sedimentation modeling into ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that reflect preliminary wind erosion effects from training activities for integration into ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that improve the Local Condition Factor in the ATTACC methodology.
- Develop a protocol, tool(s) and/or factors for installation level use that account for multi-year use of ATTACC.

By FY01:

- Develop a protocol, tool(s) and/or factors for installation level use that improve the objectivity of the Vehicle Severity Factor (VSF) in ATTACC.
- Validate the ATTACC methodology (reflecting above improvements) at pacing sites determined by ITAM proponent.
- Develop a protocol, tools, and/or factors for installation level use that improves P factors and acres affected estimation for water erosion LRAM practices.
- Develop a protocol, tools, and/or factors for installation level use that improves P factors and acres affected estimation for wind erosion LRAM practices.

By FY02:

- Develop a protocol, tool(s) and/or factors for installation level use that improve spatial results from ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that model training patterns based on doctrine for integration into ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that reflect species composition.
- Develop a protocol, tools, and/or factors for installation level use that improves LRAM practices cost estimation.

- Develop a protocol, tool, and/or factors for installation level use that predicts LRAM prescriptions based on predicted impacts.
- Develop a protocol, tools, and/or factors for installation level use that improves LCTA for training impact detection.

By FY03:
- Develop a protocol, tool(s) and/or factors for installation level use that reflect air quality impacts of wind erosion.
- Develop a protocol, tool(s) and/or factors for installation level use that reflect soil compaction and degradation.

By FY04:
- Develop a protocol, tool(s) and/or factors for installation level use that improve the objectivity of the Event Severity Factor (ESF) in ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that determine a sustainable land condition in ATTACC.

By FY05:
- Develop a protocol, tool(s) and/or factors for installation level use that provides an objective wind erosion model for use in ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that provides an alternative soil erosion model to RUSLE for use in ATTACC.

By FY06:
- Develop a protocol, tool(s) and/or factors for installation level use that characterizes land most suitable for various types of doctrinal training.

By FY07:
- Develop installation level method that identifies and incorporates into the model non-military training land use and natural resource stressors (e.g., agriculture, grazing, fire, etc.).

By FY08 and beyond:
- Develop a protocol, tool(s) and/or factors for installation level use that identifies munitions-related erosion impacts for integration into ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that identifies munitions contamination for integration into ATTACC.
- Develop a protocol, tool(s) and/or factors for installation level use that accounts for changes in Army doctrine and weapons systems affecting training pattern modeling.
- Develop a protocol, tool(s) and/or factors for installation level use that account for alternative/complementary measures of land condition.

- Develop a protocol, tool(s) and/or factors for installation level use that account for the cumulative effects of stressors.

The requirement for land capacity and characterization was ranked as conservation priority number 4 in the 1993 prioritization effort and was reprioritized as the number 3 requirement in 1999.

Appendix B: Bird Point Counts

Lake Point Count

Point Number	Number heard/saw	Distance (m)
Point 1 – at corner of pond with riparian vegetation (small trees), then open		
38 08 765		
89 43 199		
Eastern Pewee	2	100
Warbling Vireo	1	50
Northern Bobwhite	1	150
Common Grackle	6	200
Red-winged Blackbird	6	200
Song Sparrow	3	200
Field Sparrow	1	100
Point 2 – At opposite corner of same lake, riparian vegetation (small trees) then open		
38 08 816		
89 43 253		
Eastern Pewee	2	50
Song Sparrow	1	100
Northern Bobwhite	1	100
Eastern Meadowlark	2	100
Red-winged Blackbird	5	200
Common Grackle	1	100
Song Sparrow	1	100
Indigo Bunting	1	50
Point 3 – Between 2 lakes, small trees near lake, then open		
38 08 920		
89 43 159		
Field Sparrow	1	80
Canada Goose	2	200
Common Yellowthroat	2	150
American Robin	2	30
Indigo Bunting	1	50
Common Grackle	2	30
Northern Cardinal	1	150
Northern Bobwhite	1	200
Eastern Pewee	1	50

Point Number	Number heard/saw	Distance (m)
Red-winged Blackbird	8	200
Rough-winged Swallow	1	50
American Goldfinch	1	30
Point 4 – Near lake, entirely open		
38 09 183		
89 42 911		
American Robin	2	100
Indigo Bunting	1	100
American Goldfinch	1	50
Northern Bobwhite	2	150
Red-winged Blackbird	5	200
Field Sparrow	1	100
Eastern Meadowlark	3	100
Point 5 – On ridge overlooking lake, open		
38 09 294		
89 42 899		
Northern Bobwhite	2	100
Field Sparrow	1	100
Eastern Meadowlark	2	80
American Robin	2	100
Red-winged Blackbird	6	150
Barn Swallow	1	80
Purple Martin	3	150
Point 6 – Open, see lake in distance		
38 09 188		
89 43 066		
Eastern Meadowlark	6	200
Red-winged Blackbird	3	100
Mallard	3 + young	150
Eastern Kingbird	1	100

Prairie Point Count

Point Number	Number heard/saw	Distance (m)
Point 1- completely open, ditch with shrubs nearby		
38 08 917		
89 44 117		
Eastern Meadowlark	3	30
Field Sparrow	1	50
Red-winged Blackbird	7	80
Warbling Vireo	1	50

Point Number	Number heard/saw	Distance (m)
Northern Bobwhite	3	100
Common Grackle	1	50
Dickcissel	1	50
American Goldfinch	1	50
Indigo Bunting	1	50
Point 2 – completely open		
38 08 978		
89 44 047		
Red-winged Blackbird	5	50
Northern Bobwhite	2	80
Field Sparrow	2	50
Common Yellowthroat	1	100
Common Grackle	4	100
Canada Goose	6	300
Warbling Vireo	1	80
Eastern Meadowlark	3	80
Point 3 – open, small shrubs near		
38 09 019		
89 44 027		
Northern Cardinal	1	80
Northern Bobwhite	3	50
Eastern Meadowlark	5	100
Dickcissel	1	50
Canada Goose	6	400
Indigo Bunting	1	50
Red-winged Blackbird	5	100
Rough-winged Swallow	12	50
Point 4 – completely open		
38 09 072		
89 44 016		
American Goldfinch	2	30
Northern Cardinal	2	100
Warbling Vireo	1	100
Field Sparrow	4	100
Eastern Meadowlark	4	100
Red-winged Blackbird	6	100
Yellow Warbler	1	100
Common Yellowthroat	1	80
Point 5 - near ditch with cottonwoods, shrubs		
38 09 117		

Point Number	Number heard/saw	Distance (m)
89 43 997		
Mockingbird	1	100
Black-billed Cuckoo	1	80
Baltimore Oriole	2	80
Common Yellowthroat	1	100
Turkey	1	200
Great Blue Heron	1	300
Indigo Bunting	1	50
American Goldfinch	6	80
Barn Swallow	1	50
Bobolink	1	50
Field Sparrow	2	100
Northern Bobwhite	1	100
Red-winged Blackbird	3	100
Double-crested Cormorant	2	300
Point 6 – open		
38 09 163		
89 43 972		
Savannah Sparrow	1	30
Red-winged Blackbird	5	100
American Goldfinch	2	100
Northern Bobwhite	1	100
Indigo Bunting	1	50
Warbling Vireo	2	100
Field Sparrow	1	50
Point 7 – On edge of open area and riparian hill with small trees		
39 09 211		
89 43 940		
Warbling Vireo	2	50
Mallard	2	200
Indigo Bunting	1	30
Carolina Chickadee	1	30
Eastern Meadowlark	3	100
Yellow Warbler	2	50
Black-billed Cuckoo	1	30
American Goldfinch	2	50

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14. ABSTRACT

The Illinois Army National Guard (ILARNG) is acquiring a new 2800-acre reclaimed strip mine as a training area near Sparta, Illinois. This acquisition is important in that it allows the National Guard units in southern Illinois a readily available place to train, which will increase training effectiveness and save time and money through decreased travel costs associated with using the existing training area in the northern part of the state. Training importance is further enhanced by the existence of three diverse natural ecosystems, thereby offering variety of training.

The recent acquisition of the Sparta training area represents a unique opportunity to gather baseline data before any training takes place. This valuable data will give the Army the opportunity to learn about the conditions before and after training as well as strengthening any future empirically collected research data. This represents a fundamental knowledge gap in much of the current research on Army lands and represents a high priority, high payoff area of research.

The three ecosystems — riparian forest, upland plains, and lakes —were surveyed for birds, mammals, reptiles and amphibians in accordance with generally approved methods. Winter, spring and summer surveys were conducted to deter-mine species present and relative abundance.

15. SUBJECT TERMS

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natural resource management	Sparta, IL	data collection

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